CLAIMS

1. A MEMS-type resonator comprising a substrate in which a lower electrode is formed and a beam formed on the substrate, wherein at least one support column is provided between said substrate and said beam.

2. A MEMS-type resonator according to claim 1, wherein said support column is formed at a position corresponding to a node of a desired oscillation mode of said beam.

3. A MEMS-type resonator according to claim 1, wherein both upper and lower ends of said support column are integrated with said substrate and said beam.

4. A MEMS-type resonator according to claim 1, wherein said support column is formed such that one end thereof is integrated with said substrate or said beam and the other end thereof is formed not to contact with said beam or substrate.

5. A MEMS-type resonator according to claim 1, wherein an input electrode for a high frequency signal and an output electrode for a high frequency signal constitute the lower electrode of said substrate.

6. A method of manufacturing a MEMS-type resonator, comprising the steps of: forming a lower electrode on a substrate; forming a sacrifice layer on said substrate including said lower electrode; selectively forming an opening that reaches said substrate at a portion of said sacrifice layer where a support column should be formed; forming a beam on said sacrifice layer and forming inside said opening the support column integrated with said beam and said substrate; and removing said sacrifice layer.

7. A method of manufacturing a MEMS-type resonator, comprising the steps of: forming a lower electrode and a support column on a substrate; forming a sacrifice layer on said substrate including said lower electrode and said support column; forming a beam on said sacrifice layer; and removing said sacrifice layer.

8. A method of manufacturing a MEMS-type resonator, comprising the steps of: forming a lower electrode on a substrate; forming a sacrifice layer on said substrate including said lower electrode; selectively forming an opening having a depth not to reach said substrate at a portion of said sacrifice layer where a support column should be formed; forming a beam on said sacrifice layer and forming inside said opening the support

column integrated with said beam; and removing said sacrifice layer.

9. A communication apparatus including a filter to limit a band of a transmission signal and/or reception signal, comprising as said filter: a filter that includes a MEMS-type resonator having a substrate where a lower electrode is formed and a beam formed on the substrate, in which at least one support column is provided between said substrate and said beam.

10. A communication apparatus according to claim 9, wherein said support column in said filter is formed at a position corresponding to a node of a desired oscillation mode of said beam.

11. A communication apparatus according to claim 9, wherein both upper and lower ends of said support column in said filter are integrated with said substrate and said beam.

12. A communication apparatus according to claim 9, wherein said support column in said filter is formed such that one end thereof is integrated with said substrate or said beam and the other end thereof is formed not to contact with said beam or said substrate.

13. A communication apparatus according to claim 9, wherein an input electrode for a required frequency signal and an output electrode for a required frequency signal constitute the lower electrode of said substrate in said filter.